

Prüfbericht-Nr.: <i>Test report no.:</i>	CN24H1GF 001	Auftrags-Nr.: <i>Order no.:</i>	48223857	Seite 1 von 24 Page 1 of 24
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2023-09-13	
Auftraggeber: <i>Client:</i>	Microchip Technology Inc. 2355 West Chandler Blvd. Chandler, Arizona 85224-6199, United States			
Prüfgegenstand: <i>Test item:</i>	IEEE 802.11 b/g/n Link Controller Module			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	ATWILC1000-MR110PB			
Auftrags-Inhalt: <i>Order content:</i>	FCC Part 15C Test report (WiFi 2.4GHz)			
Prüfgrundlage: <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.247			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2023-12-06			
Prüfmuster-Nr.: <i>Test sample no:</i>	A003618205-005 A003618205-008			
Prüfzeitraum: <i>Testing period:</i>	2024-02-02 - 2024-06-11			
Ort der Prüfung: <i>Place of testing:</i>	EMC/RF Taipei Testing Site			
Prüflaboratorium: <i>Testing laboratory:</i>	Taipei Testing Laboratories			
Prüfergebnis*: <i>Test result*:</i>	Pass			
überprüft von: <i>compiled by:</i>	genehmigt von: <i>authorized by:</i>			
Datum: <i>Date:</i>	2024-06-24		2024-06-24	
Stellung / Position:	Senior Project Manager		Senior Project Manager	
Sonstiges / Other:	This report is to add new source of crystal (Taisaw: TZ1039PAAF32 and Taitien: A0183-X-001-3). Only the output power at normal temperature and radiated spurious emissions tests were evaluated. For other test results, please refer to the Test Report D50909R1 of Compatible Electronics Inc.			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	4 = ausreichend N/A = nicht anwendbar
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory F(ail) = failed a.m. test specification(s)	4 = sufficient N/A = not applicable
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

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Anmerkungen
Remarks

- | | |
|----------|--|
| 1 | <p>Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben.</p> <p>Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.</p> <p><i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i></p> |
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| 3 | <p>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben.</p> <p>Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.</p> <p><i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i></p> <p><i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i></p> |
| 4 | <p>Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019.</p> <p><i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i></p> |

TEST SUMMARY

Report Section	FCC Clause	Test Item	Result
5.1.1	15.247(b) & 15.203	Antenna Requirement	Pass
5.1.2	15.247(b)(3)	Peak Output Power	Pass
-	15.247(a)(2)	6 dB Bandwidth	Note 1
-	2.1049	99% Occupied Bandwidth	Note 1
-	15.247(e)	Power Spectral Density	Note 1
-	15.247(d)	Conducted Spurious Emissions and Band Edges	Note 1
5.1.3	15.247(d) & 15.205 & 15.209	Radiated Spurious Emissions and Band Edges	Pass
-	15.207	Mains Conducted Emission	N/A

Note:

1. Please refer to the Test Report D50909R1 of Compatible Electronics Inc.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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APPENDIX A - TEST RESULT OF RADIATED EMISSIONS

APPENDIX SP - PHOTOGRAPHS OF TEST SETUP

APPENDIX EP - PHOTOGRAPHS OF EUT

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HISTORY OF THIS TEST REPORT

Revision	Description	Date Issued
R01	Original Release	2024-06-24

1. General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A - Test Result of Radiated Emissions

Appendix SP - Photographs of Test Setup

Appendix EP - Photographs of EUT

Applied Standard and Test Levels

Radio
FCC 47CFR Part 15: Subpart C Section 15.247
FCC 47CFR Part 2: Subpart J Section 2.1049
ANSI C63.10:2013
KDB 558074 D01 15.247 Meas Guidance v05r02

1.2 Decision Rule of Conformity

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard.

2. Test Sites

2.1 Test Laboratory

Taipei Testing Laboratories

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

2.2 Test Facility

Taipei Testing Laboratories

No.458-18, Sec. 2, Fenliao Rd., Linkou Dist.,
New Taipei City 244
Taiwan (R.O.C.)
FCC Registration No.: 180491
ISED Registration No.: 25563

2.3 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

2.5 Measurement Uncertainty

All measurement uncertainty values are shown with a coverage factor of $k=2$ to indicate a 95% level of confidence.

Emission Measurement Uncertainty

Parameter	Uncertainty
Radiated Emission (9 kHz ~ 30 MHz)	± 1.15 dB
Radiated Emission (30 MHz ~ 200 MHz)	± 1.32 dB
Radiated Emission (200 MHz ~ 1 GHz)	± 1.31 dB
Radiated Emission (1 GHz ~ 18 GHz)	± 1.53 dB
Radiated Emission (18 GHz ~ 40 GHz)	± 2.50 dB
Mains Conducted Emission	± 1.65 dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a IEEE 802.11 b/g/n Link Controller Module. It contains a WLAN compatible module enabling the user to communicate data through a Wireless interface.
For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	IEEE 802.11 b/g/n Link Controller Module
Type Identification	ATWILC1000-MR110PB
FCC ID	2ADHKATWILC1000

Technical Specification of EUT

Item	EUT information
Operating Frequency	2412 MHz ~ 2462 MHz
Channel Spacing	5 MHz
Channel Number	802.11b/g/n HT20: 11
Data Rate	802.11b: 11.0 / 5.5 / 2.0 / 1.0 Mbps 802.11g: 54.0 / 48.0 / 36.0 / 24.0 / 18.0 / 12.0 / 9.0 / 6.0 Mbps 802.11n: up to MCS7
Operation Voltage	3.0 Vdc ~ 4.2 Vdc (Typical = 3.3 Vdc)
Modulation	DSSS (DBPSK, DQPSK, CCK) OFDM (BPSK, QPSK, 16QAM, 64QAM)
Maximum Output Power (mW)	802.11b: 122.74 802.11g: 206.54 802.11n HT20: 199.99
Antenna Information	Refer to 5.1.1
Accessory Device	Refer to 4.4

3.3 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.4 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The test modes were adapted accordingly in reference to the instructions for use.

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output expected by the customer and is going to be fixed on the firmware of the final end product.

Table for Parameters of Test Software Setting

Mode	802.11b			802.11g			802.11n HT20		
Channel	1	6	11	1	6	11	1	6	11
Frequency (MHz)	2412	2437	2462	2412	2437	2462	2412	2437	2462
Power Setting	-8	-7.5	-9.5	-9.5	-8	-9	-11	-8	-9

4.2 Carrier Frequency and Channel

802.11b, 802.11g and 802.11n HT20:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432		
6	2437		
7	2442		

4.3 Test Operation and Test Software

Setup for testing: Test samples are provided with a USB interface which makes it possible to control them through a test software installed on a notebook computer.

This software was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed as below.

Test Software	MCHPRT2 ver1.7.6.1
---------------	--------------------

The samples were used as follows:

A003618205-005

A003618205-008

Full test was applied on all test modes, but only worst case was shown.

The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitter and receiver.

Modulation Mode	Tx Function
802.11b	1TX (SISO)
802.11g	1TX (SISO)
802.11n HT20	1TX (SISO)

EUT Configure Mode	Applicable To				Description
	Antenna Port Conducted Measurement	Radiated Spurious Emissions above 1 GHz	Radiated Spurious Emissions below 1 GHz	Mains Conducted Emission	
-	√	√	√	-	-

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when position on **Y-plane**.
2. "-" means no effect.

Antenna Port Conducted Measurement

☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Date Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	1.0
-	802.11g	1 to 11	1, 6, 11	6.0
-	802.11n HT20	1 to 11	1, 6, 11	MCS0

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Radiated Spurious Emissions (Above 1 GHz)

- ☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Date Rate (Mbps)
-	802.11b	1 to 11	1, 6, 11	1.0
-	802.11g	1 to 11	1, 6, 11	6.0
-	802.11n HT20	1 to 11	1, 6, 11	MCS0

Radiated Spurious Emissions (Below 1 GHz)

- ☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Available Channel	Tested Channel	Date Rate (Mbps)
-	802.11g	1 to 11	6	6.0

Test Condition

Test Item	Ambient Temperature	Relative Humidity	Tested by
Conducted Measurement	22.5-25.8 °C	54-62 %	Nick Guan
Radiated Spurious Emissions above 1 GHz	23.7-24.6 °C	52-55 %	Roger Liao
Radiated Spurious Emissions below 1 GHz	23.7-24.6 °C	52-55 %	Roger Liao

4.4 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

Accessory of EUT

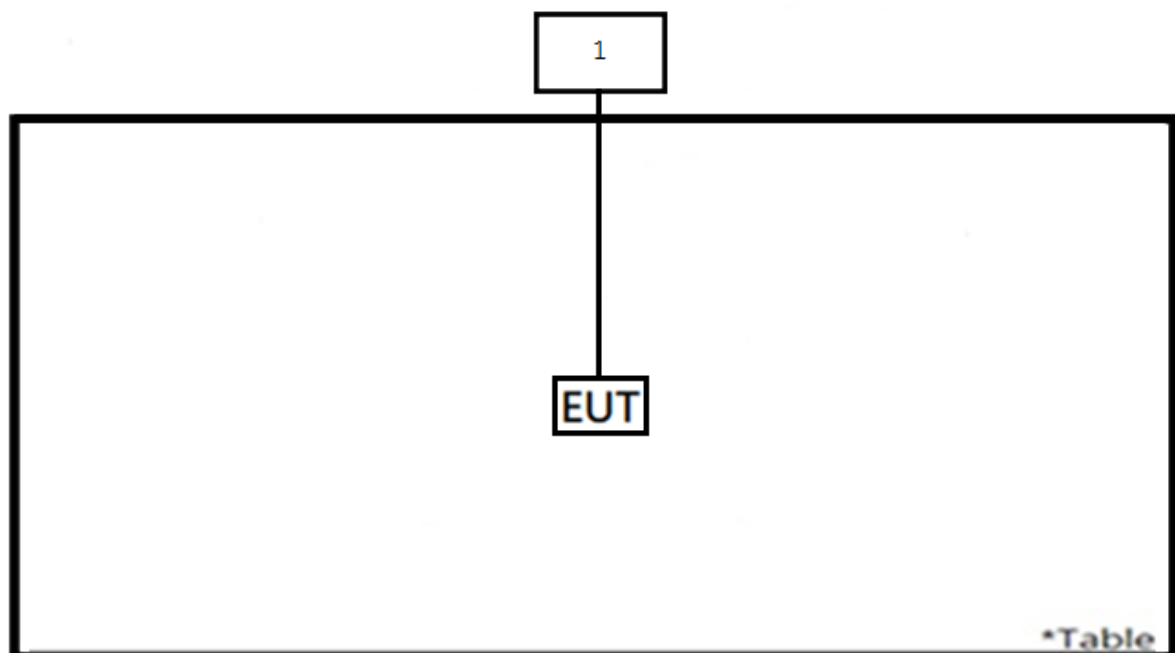
None.

Support Unit

Support Unit								
No.	Description	Brand	Model	S/N	Shielded	Ferrite Core (Qty)	Length (cm)	Remark
Radiated Test								
1	DC Power Supply	GWInstek	GPS-3030	-	-	-	-	-
Conducted Test								
-	Notebook	HP	TPN-C139	CND93662WT	-	-	-	-
-	Power Supply	GWInstek	GPS-3303	GEU915620	-	-	-	-

4.5 Test Setup Diagram

<Radiated Spurious Emissions mode>



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

Requirement Use of approved antennas only

According to the manufacturer declaration, the EUT has an antenna with a directional gain of -0.30 dBi. The antenna is a PCB antenna with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

Refer to EUT photo for details.

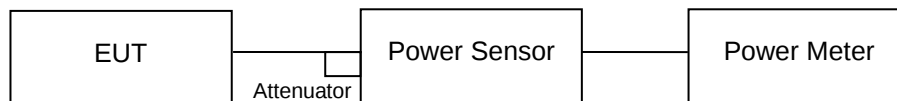
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5.1.2 Peak Output Power

Limit 1 watt (30 dBm)

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Power Meter	Anritsu	ML2495A	1901008	2024/03/12	2025/03/12	2024/6/11	2024/6/11
Power Sensor	Anritsu	MA2411B	1725269	2024/03/12	2025/03/12	2024/6/11	2024/6/11

Test Procedures

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

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Test Result

Peak Output Power

<802.11b>

Channel	Channel Frequency (MHz)	Peak Output Power		Limit (dBm)
		(dBm)	(mW)	
1	2412	20.52	112.72	30
6	2437	20.89	122.74	30
11	2462	19.59	90.99	30

<802.11g>

Channel	Channel Frequency (MHz)	Peak Output Power		Limit (dBm)
		(dBm)	(mW)	
1	2412	21.72	148.59	30
6	2437	23.15	206.54	30
11	2462	22.19	165.58	30

<802.11n HT20>

Channel	Channel Frequency (MHz)	Peak Output Power		Limit (dBm)
		(dBm)	(mW)	
1	2412	20.38	109.14	30
6	2437	23.01	199.99	30
11	2462	22.10	162.18	30

Average Power**<802.11b>**

Channel	Channel Frequency (MHz)	Average Power	
		(dBm)	(mW)
1	2412	18.03	63.53
6	2437	18.46	70.15
11	2462	16.91	49.09

<802.11g>

Channel	Channel Frequency (MHz)	Average Power	
		(dBm)	(mW)
1	2412	13.66	23.23
6	2437	15.49	35.40
11	2462	14.33	27.10

<802.11n HT20>

Channel	Channel Frequency (MHz)	Average Power	
		(dBm)	(mW)
1	2412	12.20	16.60
6	2437	15.42	34.83
11	2462	14.28	26.79

5.1.3 Radiated Spurious Emissions and Band Edges

Limit

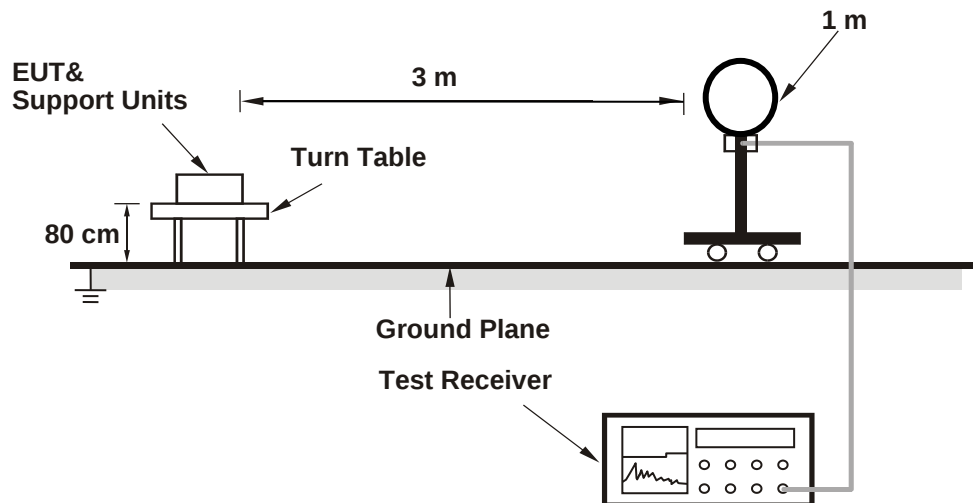
Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a).

Emissions radiated outside the restricted and authorized frequency bands must either comply with the radiated emission limits specified for the restricted bands or in §15.247(d).

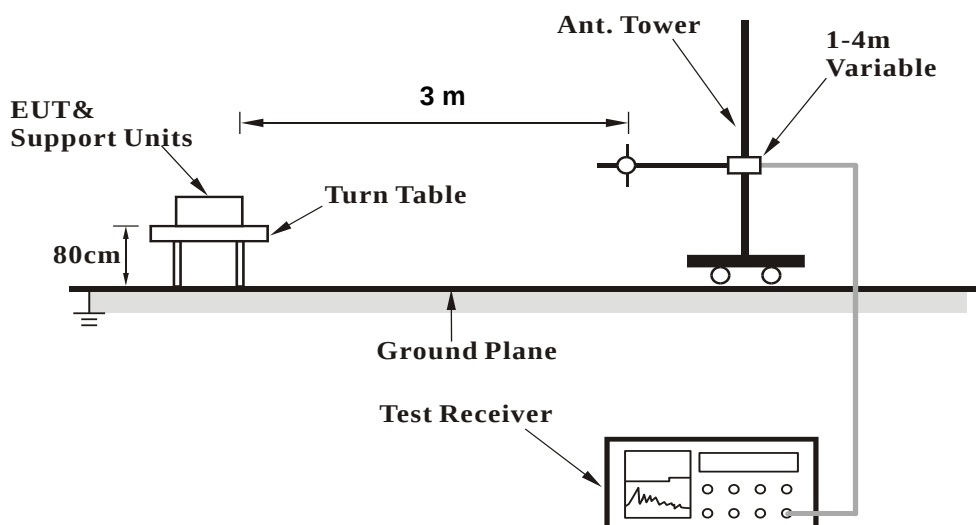
Kind of Test Site 3m Semi-Anechoic Chamber

Test Setup

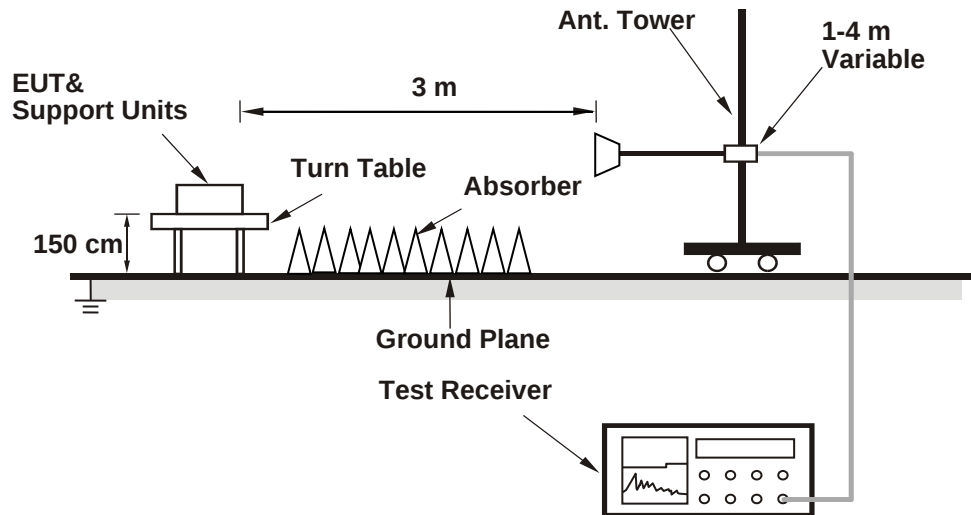
<Radiated Emissions below 30 MHz>



<Radiated Emissions 30 MHz to 1 GHz>



<Radiated Emissions above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

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Test Instruments

Test date: 2024-02-21 ~ 2024-03-08

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Above 1GHz					
Signal Analyzer	R&S	FSV40	101509	2023/4/26	2024/4/24
Signal Analyzer	R&S	FSV40	101509	2024/4/30	2025/4/29
Horn Antenna	ETS-Lindgren	3117	00218929	2023/11/17	2024/11/15
HF-AMP + AC source	EMCI	EM01G18GA	980657	2024/1/24	2025/1/22
HF-AMP + AC source	EMCI	EMC184045SE	980656	2024/1/18	2025/1/16
Horn Antenna	SCHWARZBECK	BBHA 9170	00890	2023/5/4	2024/5/2
Horn Antenna	SCHWARZBECK	BBHA 9170	00890	2024/4/30	2025/4/29
30MHz ~ 1GHz					
Receiver	R&S	ESR7	102109	2024/1/24	2025/1/22
Bilog Antenna	SCHWARZBECK	VULB-9168	00951	2023/3/31	2024/3/29
Bilog Antenna	SCHWARZBECK	VULB-9168	00951	2024/3/21	2025/3/20
LF-AMP	Agilent	8447D	2727A05146	2024/1/24	2025/1/22
Below 30MHz					
Receiver	R&S	ESR7	102109	2024/1/24	2025/1/22
Loop Antenna	SCHWARZBECK	FMZB 1519B	00215	2024/1/4	2025/1/2

Test Procedures**For Radiated Emissions below 30 MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel (OPEN), perpendicular (CLOSE), and ground-parallel (GROUND) orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated Emissions above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10 Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1 GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The Radiated Emissions testing was performed in the X(E1), Y(H) and Z(E2) axis orientation. The worst-case Axis orientation is recorded in this test report.
6. The emission levels of other frequencies (including the 10th harmonic of the highest fundamental frequency) are very lower than the limit and are not shown in the test report.

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Test Results

Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – Amplifier (dB)

Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

Please refer to Appendix A.

Appendix A: Test Results of Radiated Spurious Emissions

Band Edges, 2.31GHz ~ 2.5GHz

802.11b

Low Channel (Horizontal) Peak

TUV Rheinland Taiwan Ltd.
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Tel: +886-2172-1000 Fax: +886-2172-1322

Level (dBuV/m) Date: 2024-02-21

Frequency (Mhz)

	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	2375.93	55.93	17.92	38.01	74.00	-18.07	339	192	Peak	Horizontal	
2 *	2412.00	102.48	64.33	38.15	74.00	28.48	339	192	Peak	Horizontal	
3	2492.84	55.72	17.41	38.31	74.00	-18.28	339	192	Peak	Horizontal	

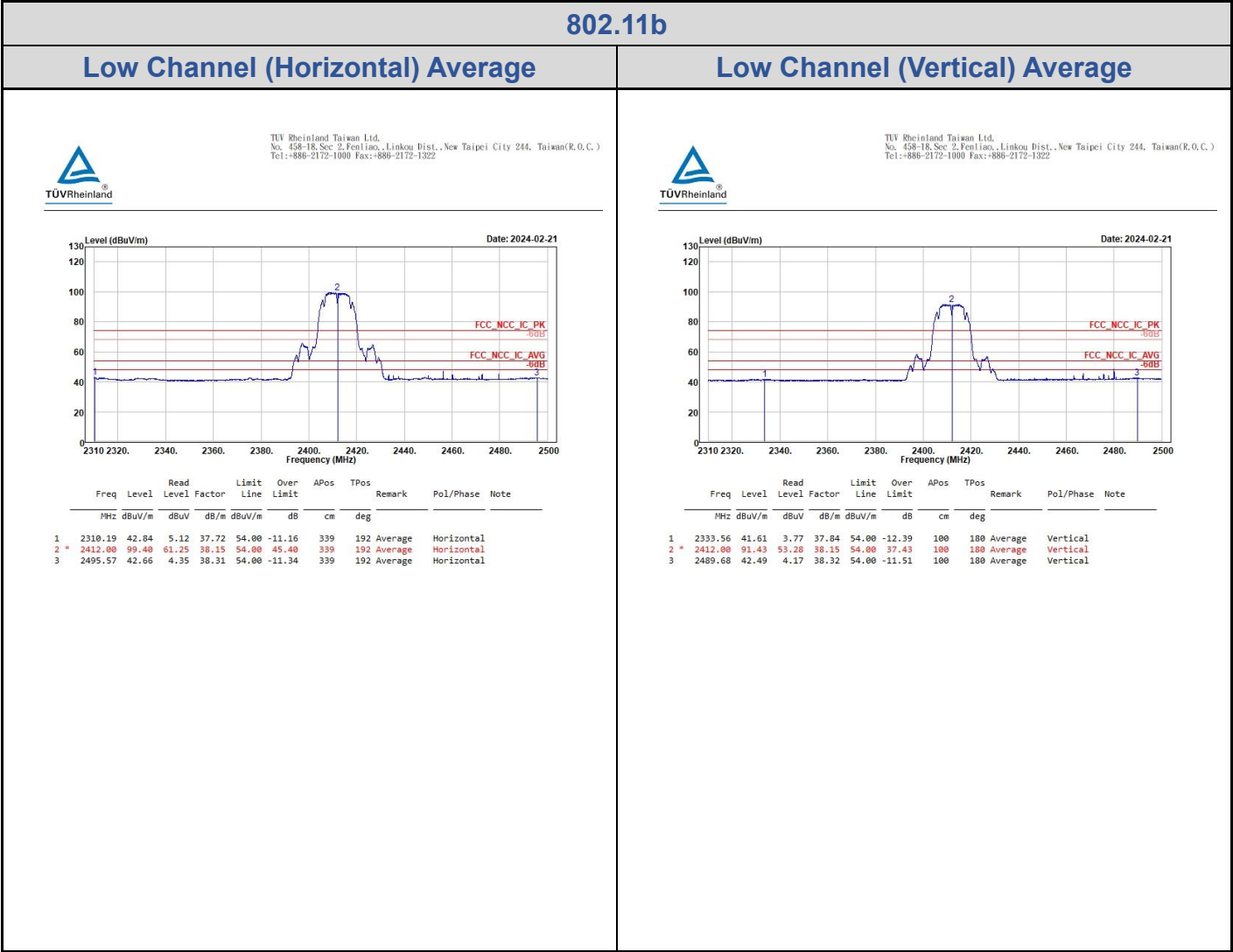
Low Channel (Vertical) Peak

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Level (dBuV/m) Date: 2024-02-21

Frequency (Mhz)

	Freq	Level	Read	Factor	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	2329.06	55.41	17.59	37.82	74.00	-18.59	100	180	Peak	Vertical	
2 *	2412.00	94.49	56.34	38.15	74.00	20.49	100	180	Peak	Vertical	
3	2491.51	55.30	16.98	38.32	74.00	-18.70	100	180	Peak	Vertical	

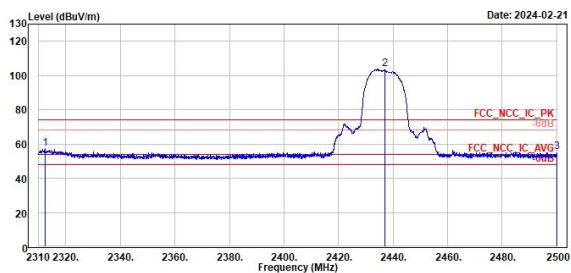


802.11b

Middle Channel (Horizontal) Peak



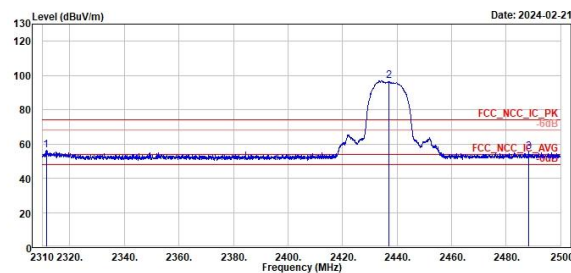
TUV Rheinland Taiwan Ltd.
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	Freq	Level	Read dBm	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBm	dBm	dB/m	dBm/m	dB	cm	deg			
1	2312.28	57.31	19.58	37.73	74.00	-16.69	335	193	Peak	Horizontal	
2 *	2437.00	103.83	65.55	38.28	74.00	29.83	335	193	Peak	Horizontal	
3	2500.00	55.43	17.12	38.31	74.00	-18.57	335	193	Peak	Horizontal	



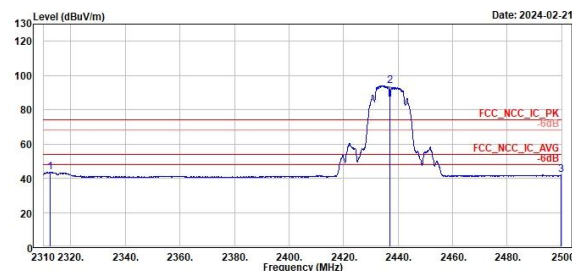
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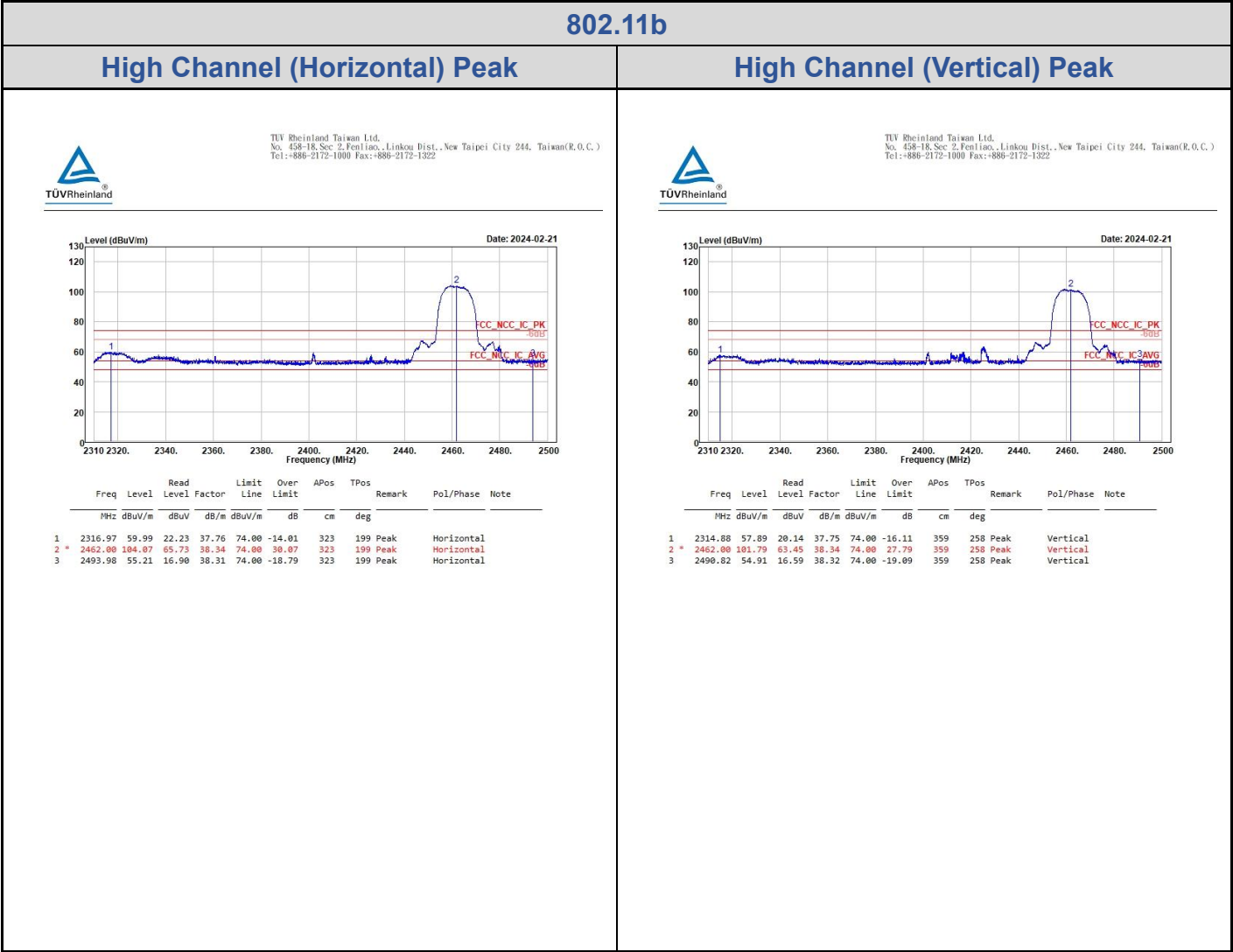
	Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2311.33	56.18	18.45	37.73	74.00	-17.82	374	174 Peak	Vertical	
2	2437.00	97.04	58.76	38.28	74.00	23.04	374	174 Peak	Vertical	
3	2489.41	55.16	16.84	38.32	74.00	-18.84	374	174 Peak	Vertical	

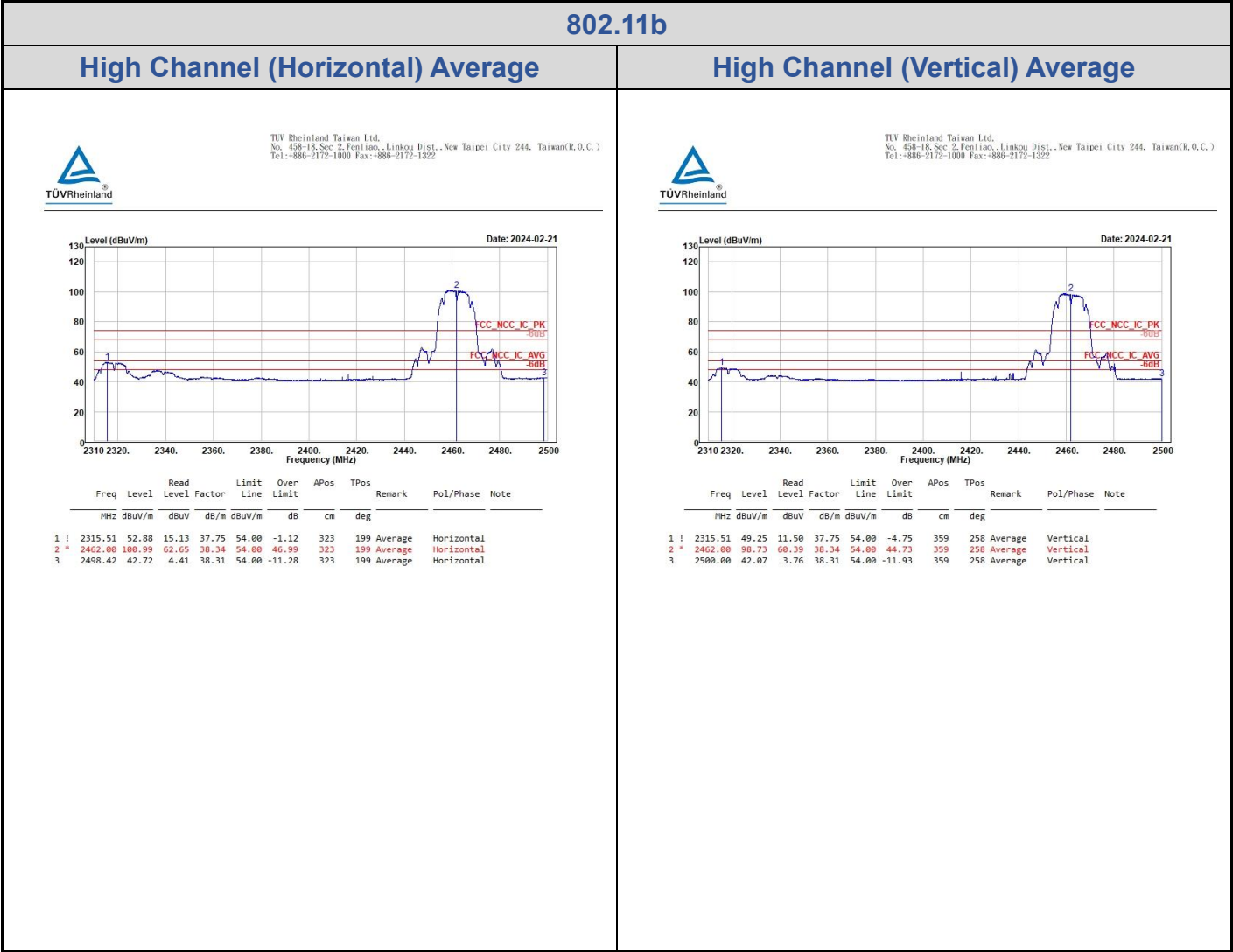
Middle Channel (Vertical) Average

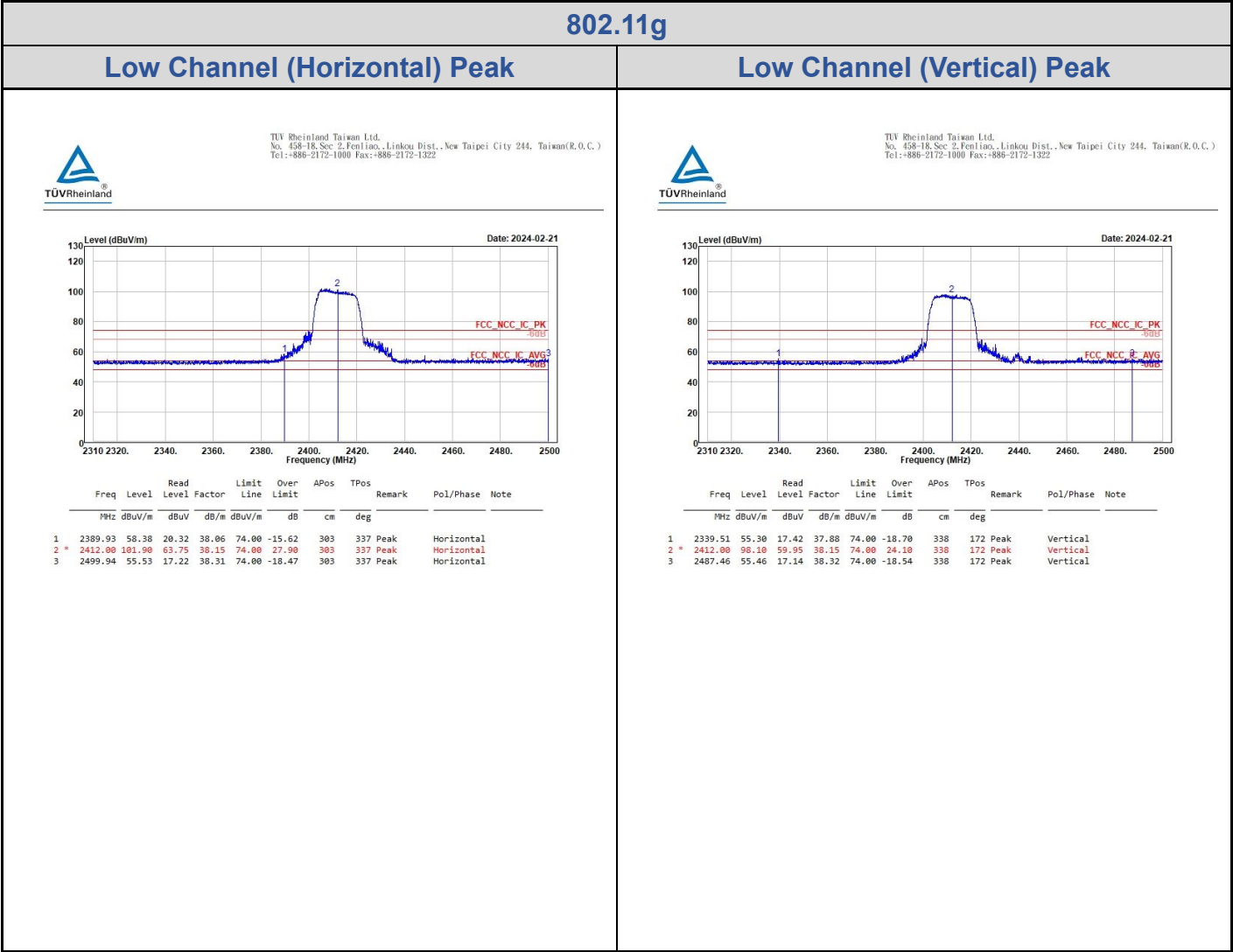
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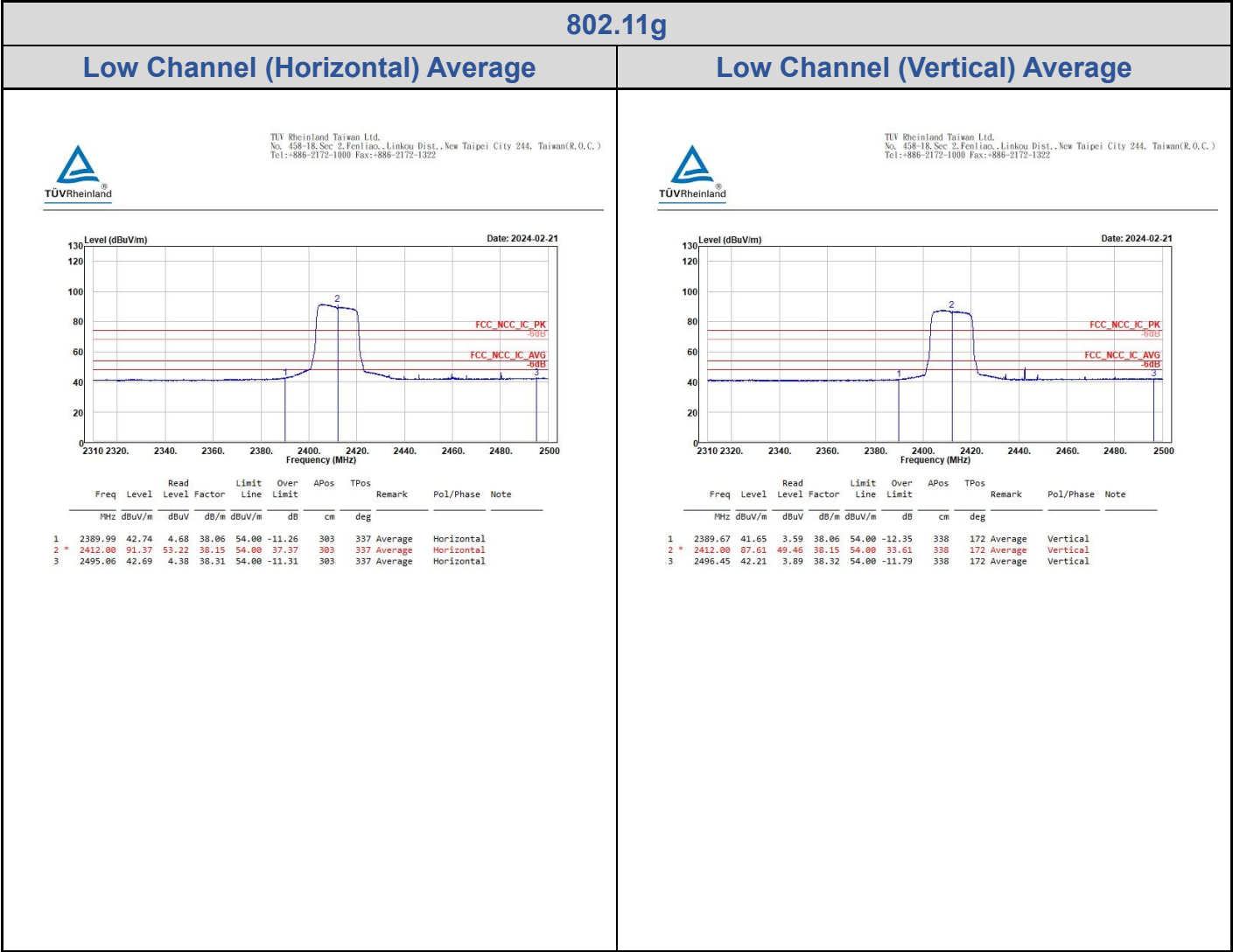


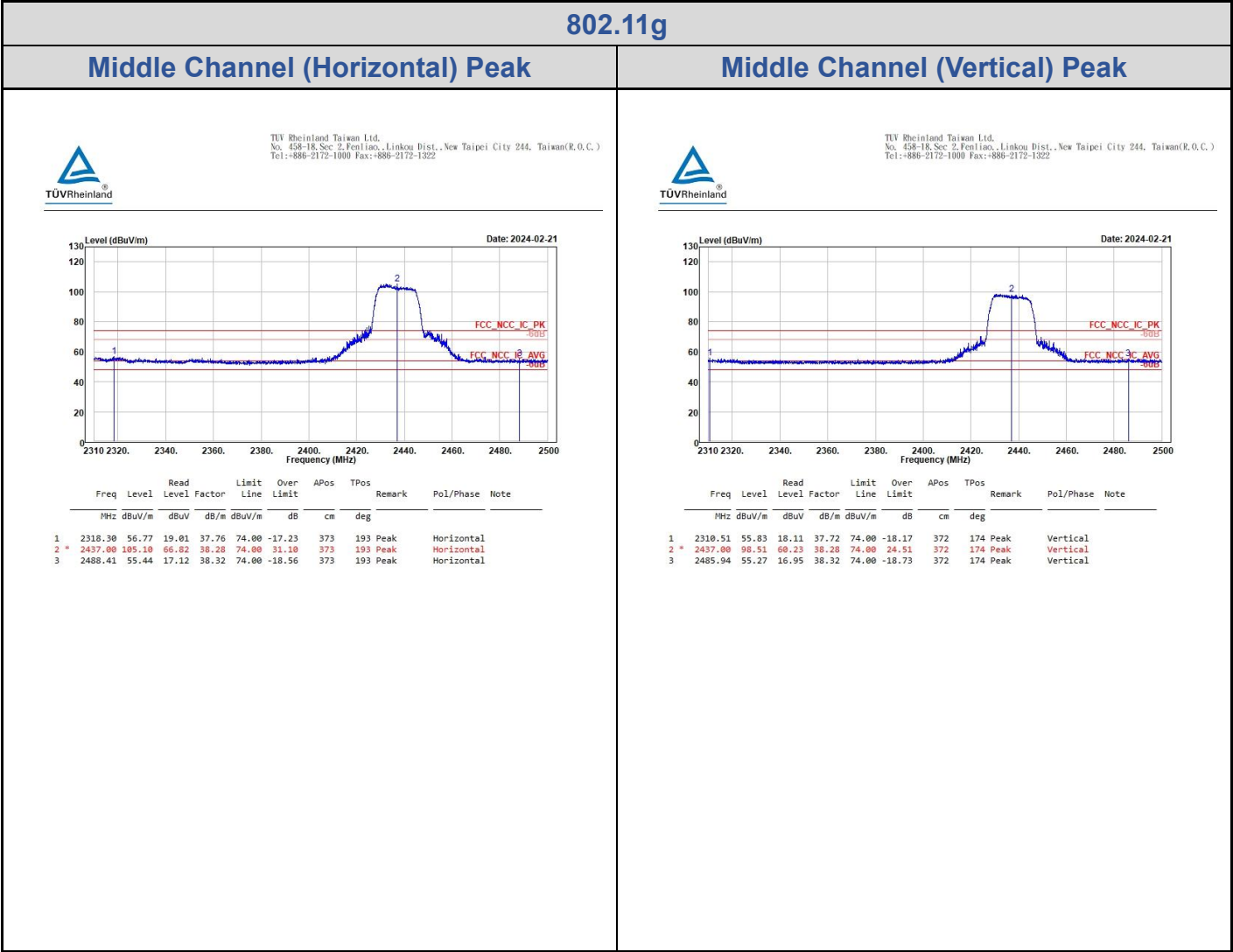
	Freq	Level	Read Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	NHz	dBuV/m	dB/m	dBuV/m	dB	cm	deg			
1	2312.34	43.55	5.82	37.73	54.00	-10.45	374	174 Average	Vertical	
2	2437.00	94.02	55.74	38.28	54.00	40.02	374	174 Average	Vertical	
3	2499.62	91.82	3.51	38.31	54.00	-12.18	374	174 Average	Vertical	

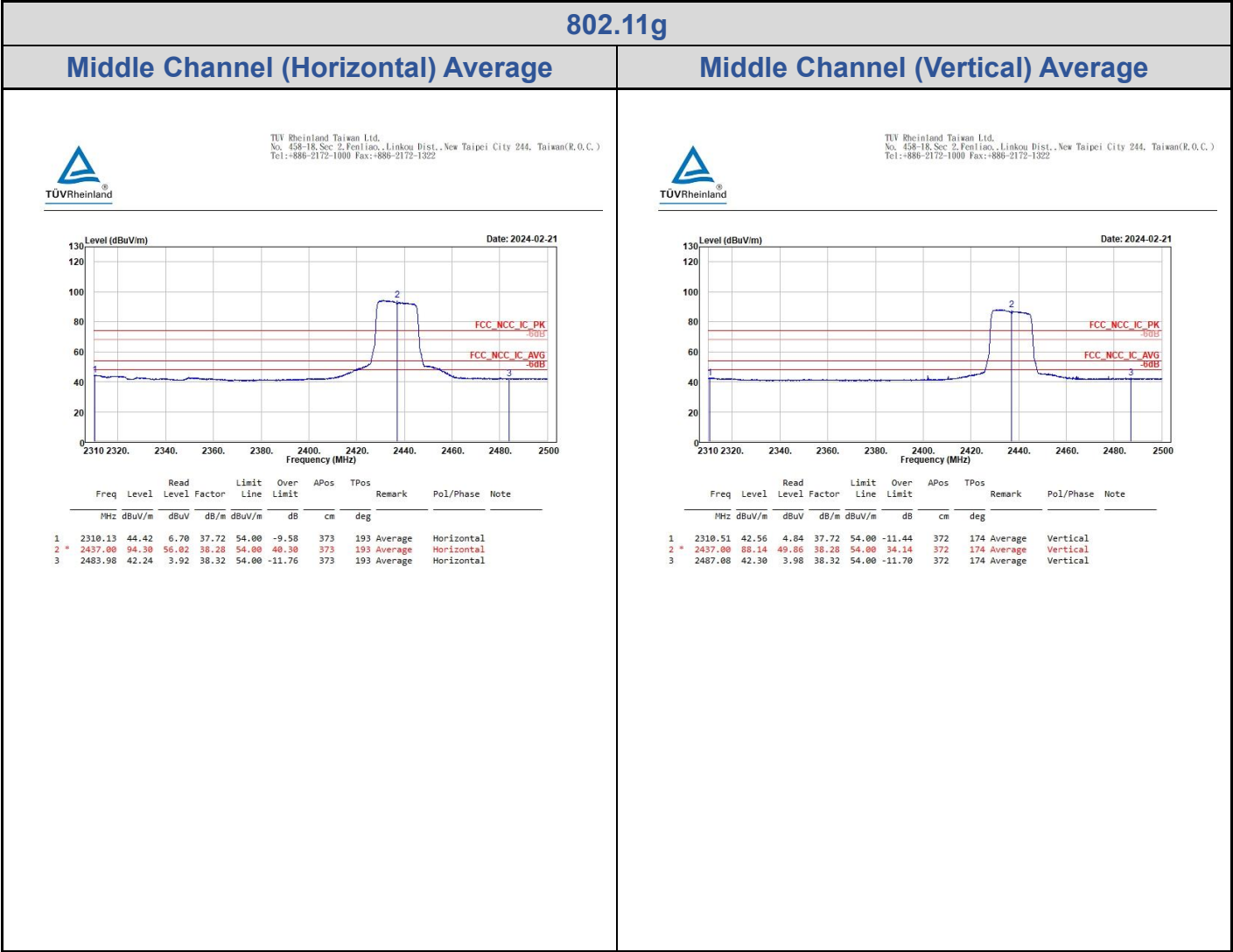


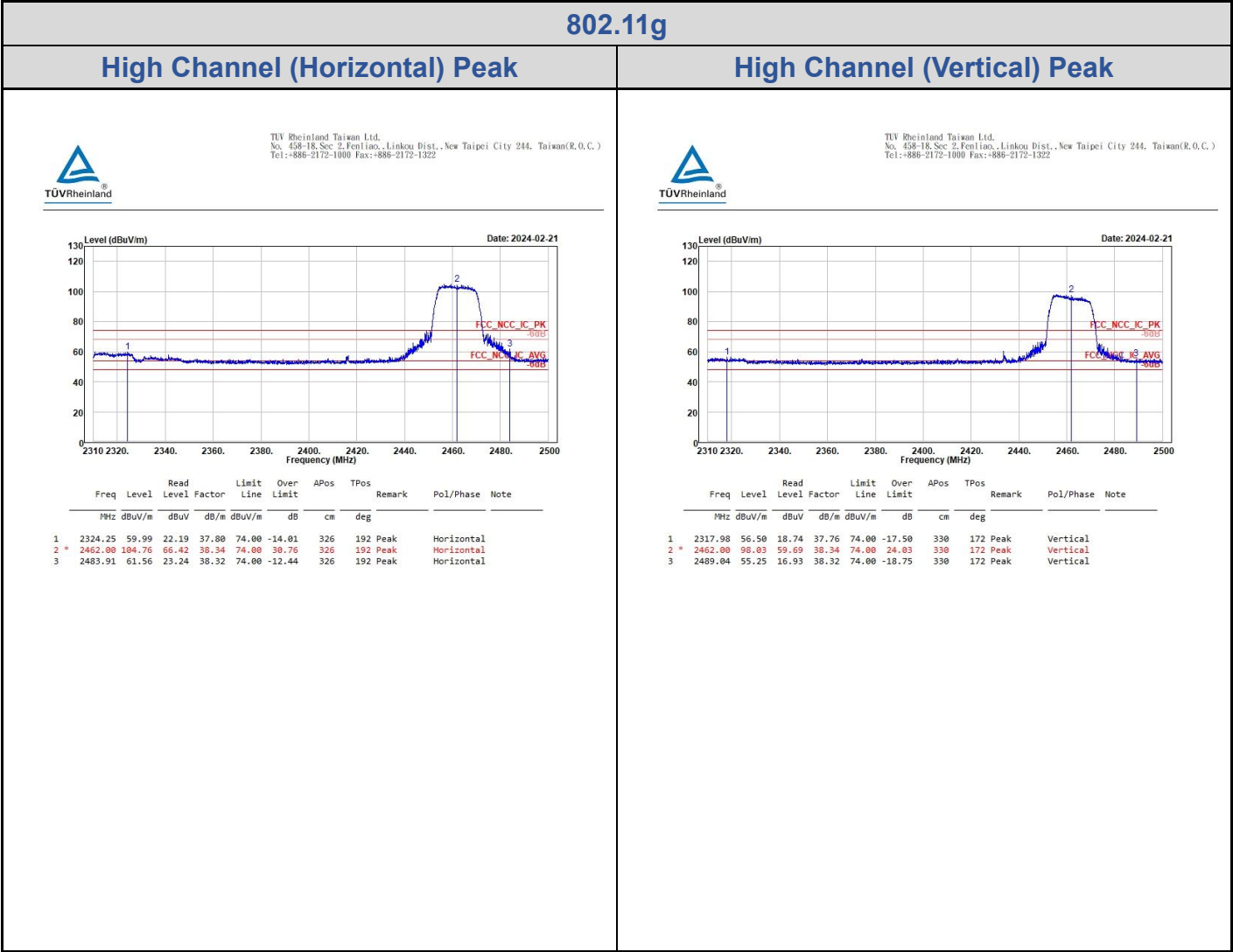


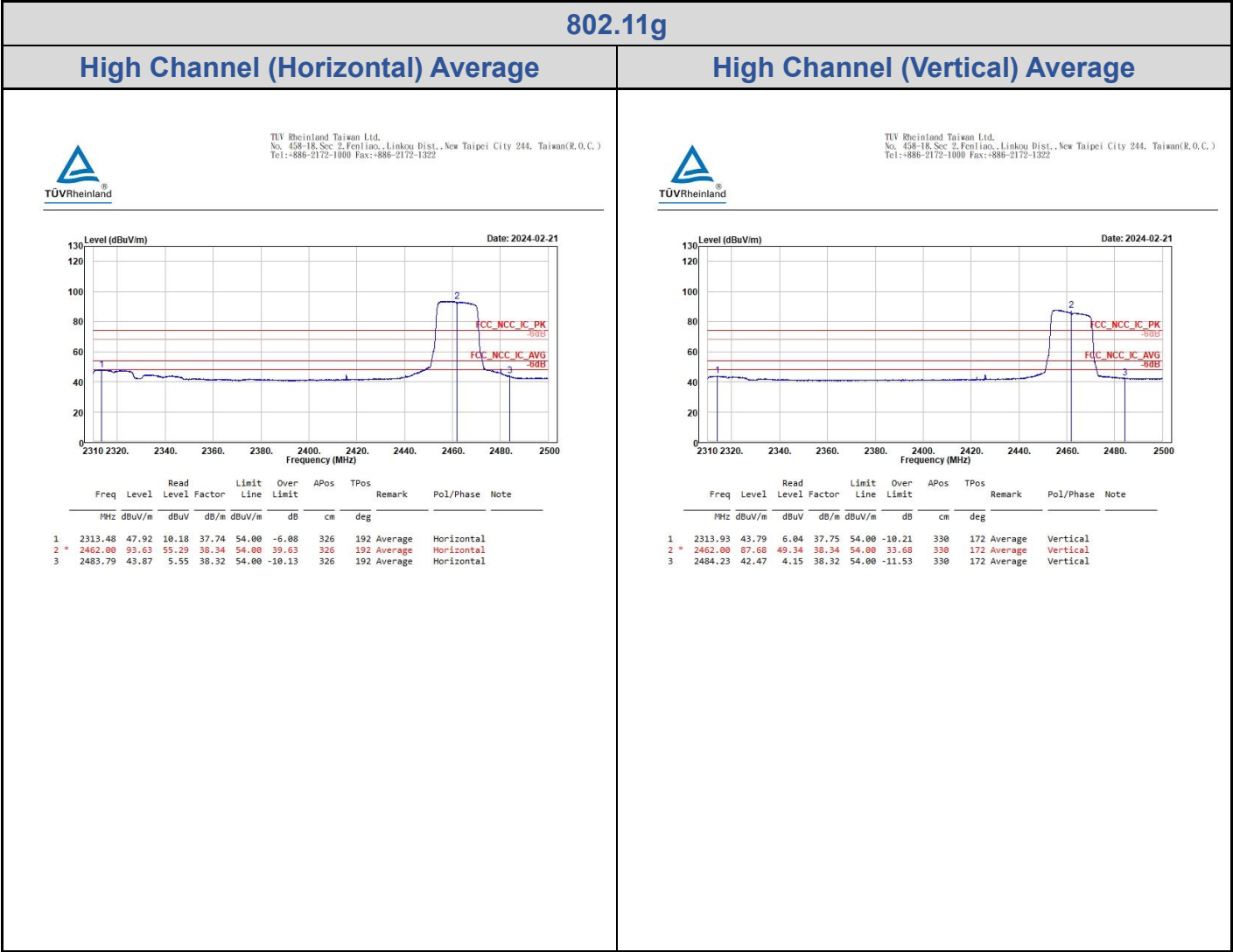


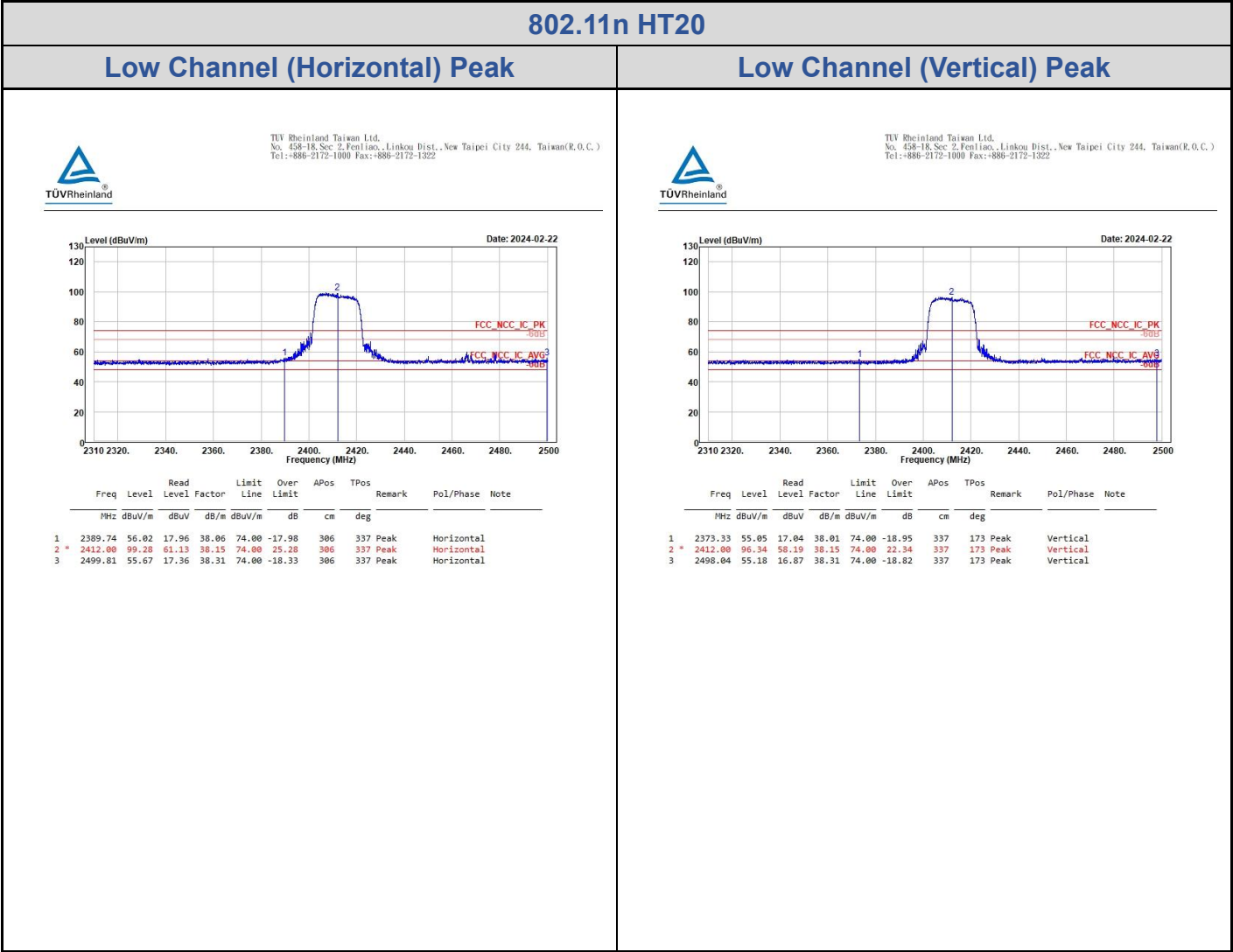


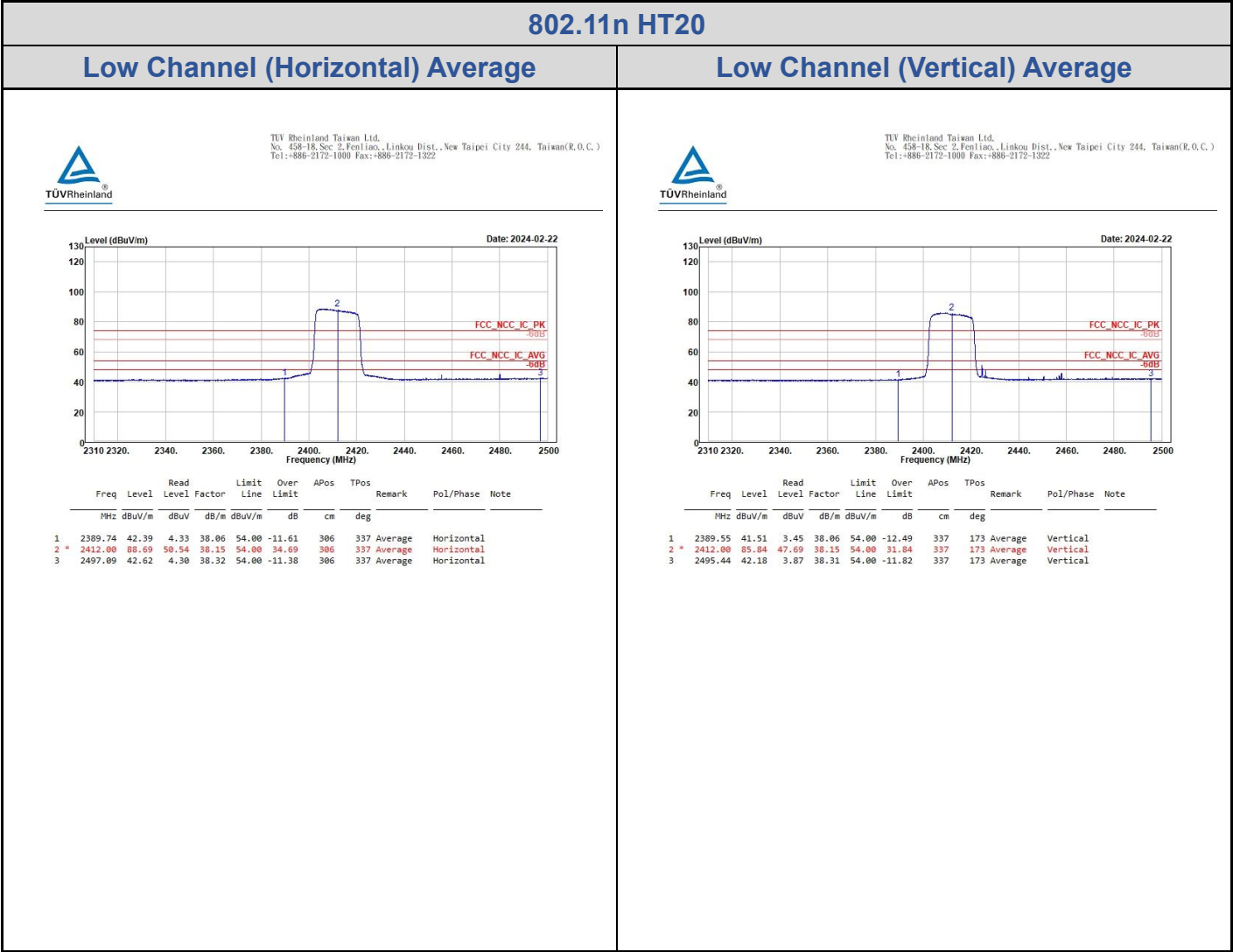


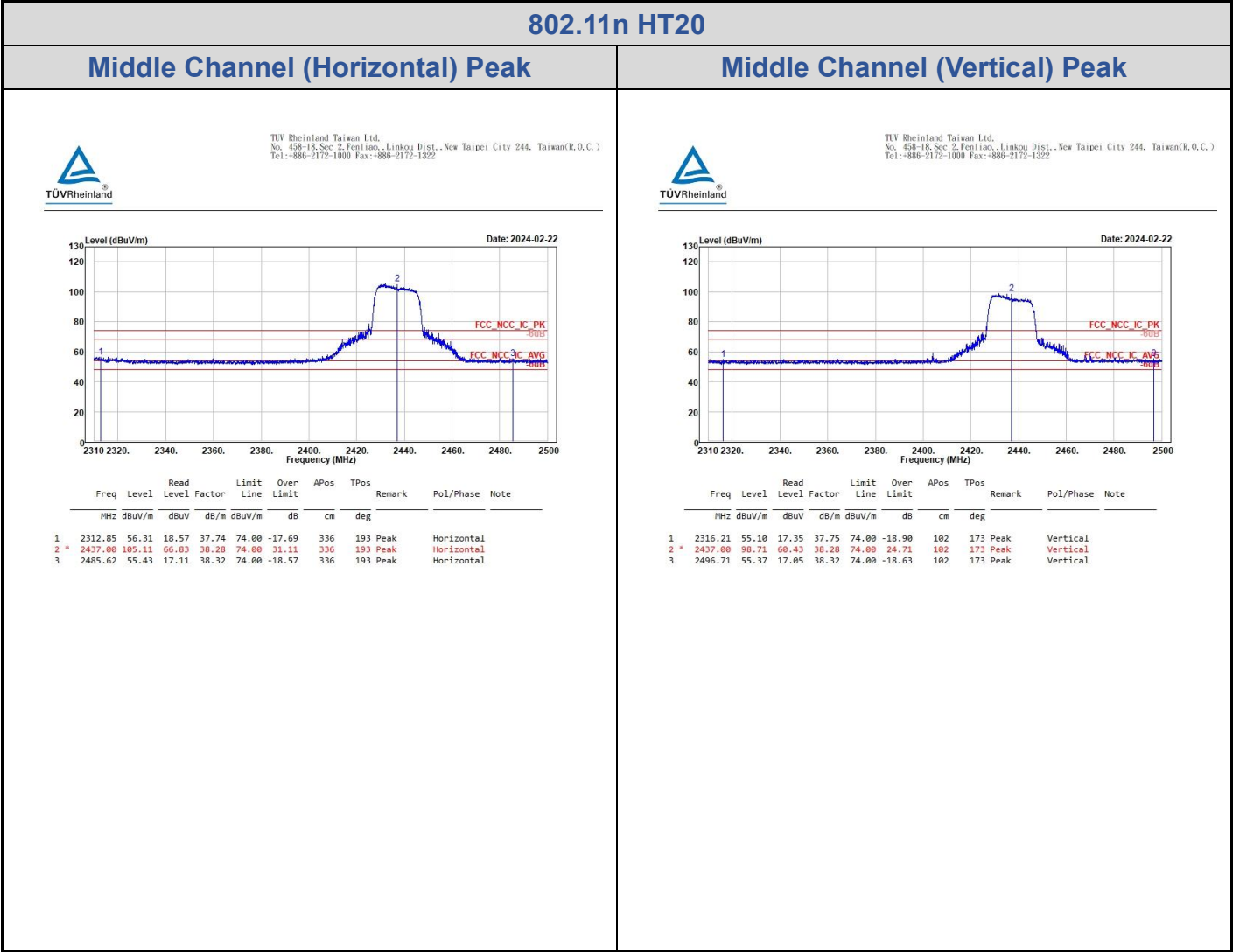










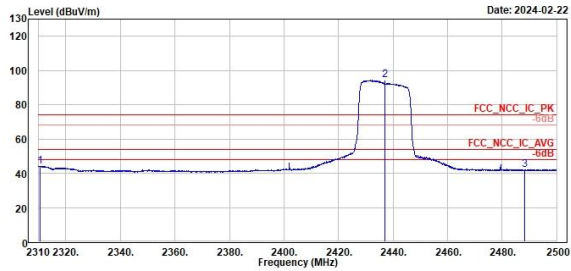


802.11n HT20

Middle Channel (Horizontal) Average



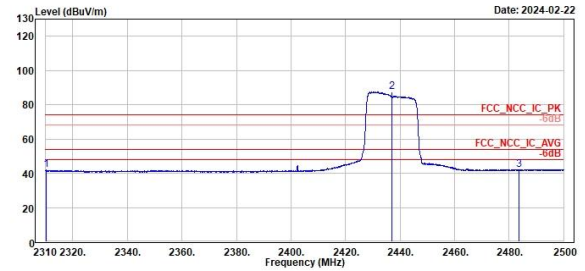
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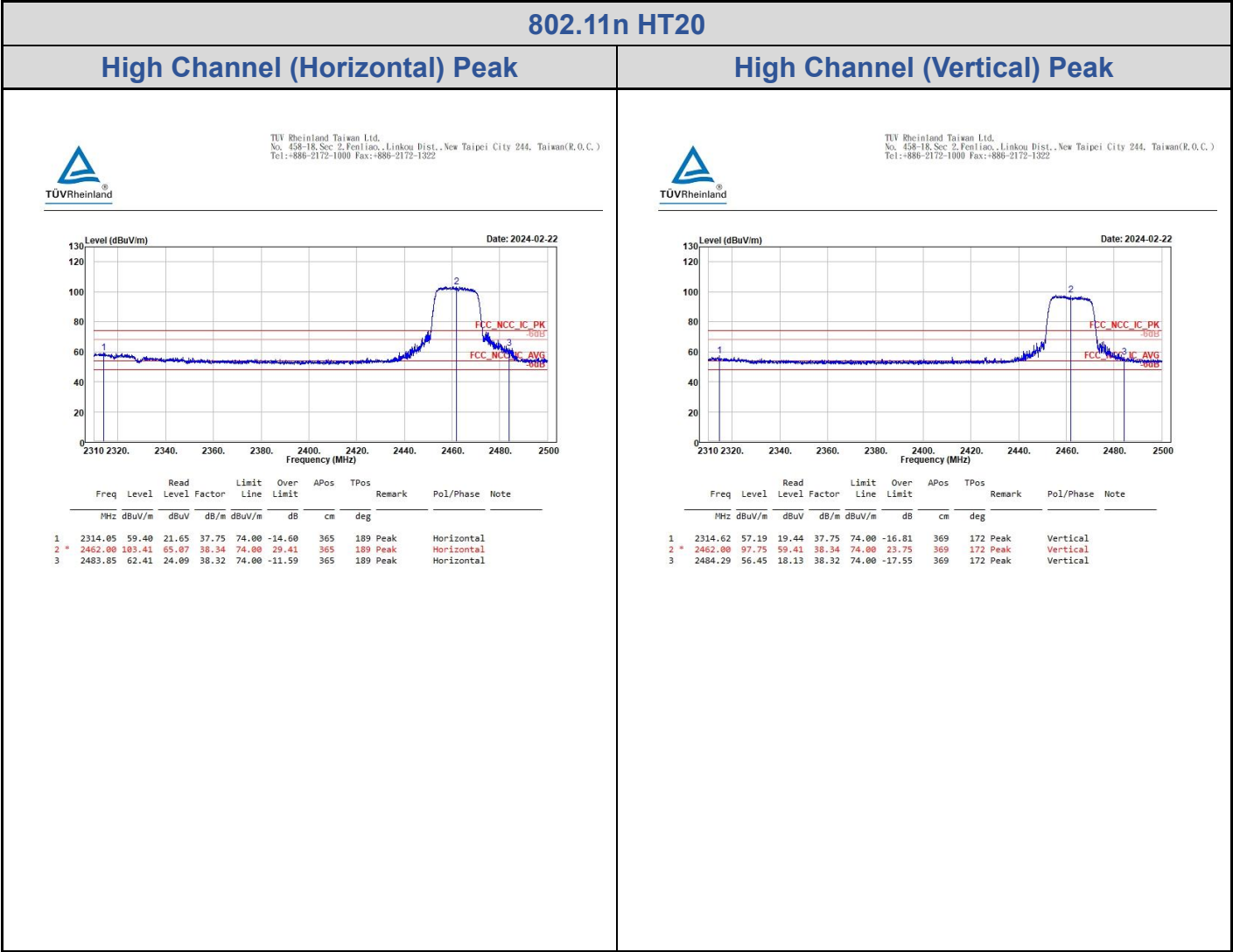
	Freq	Level	Read Level	Limit Factor	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2310.70	44.16	6.44	37.72	54.00	-9.84	336	193 Average	Horizontal	
2 *	2437.00	94.40	56.12	38.28	54.00	40.40	336	193 Average	Horizontal	
3	2488.16	42.18	3.86	38.32	54.00	-11.82	336	193 Average	Horizontal	



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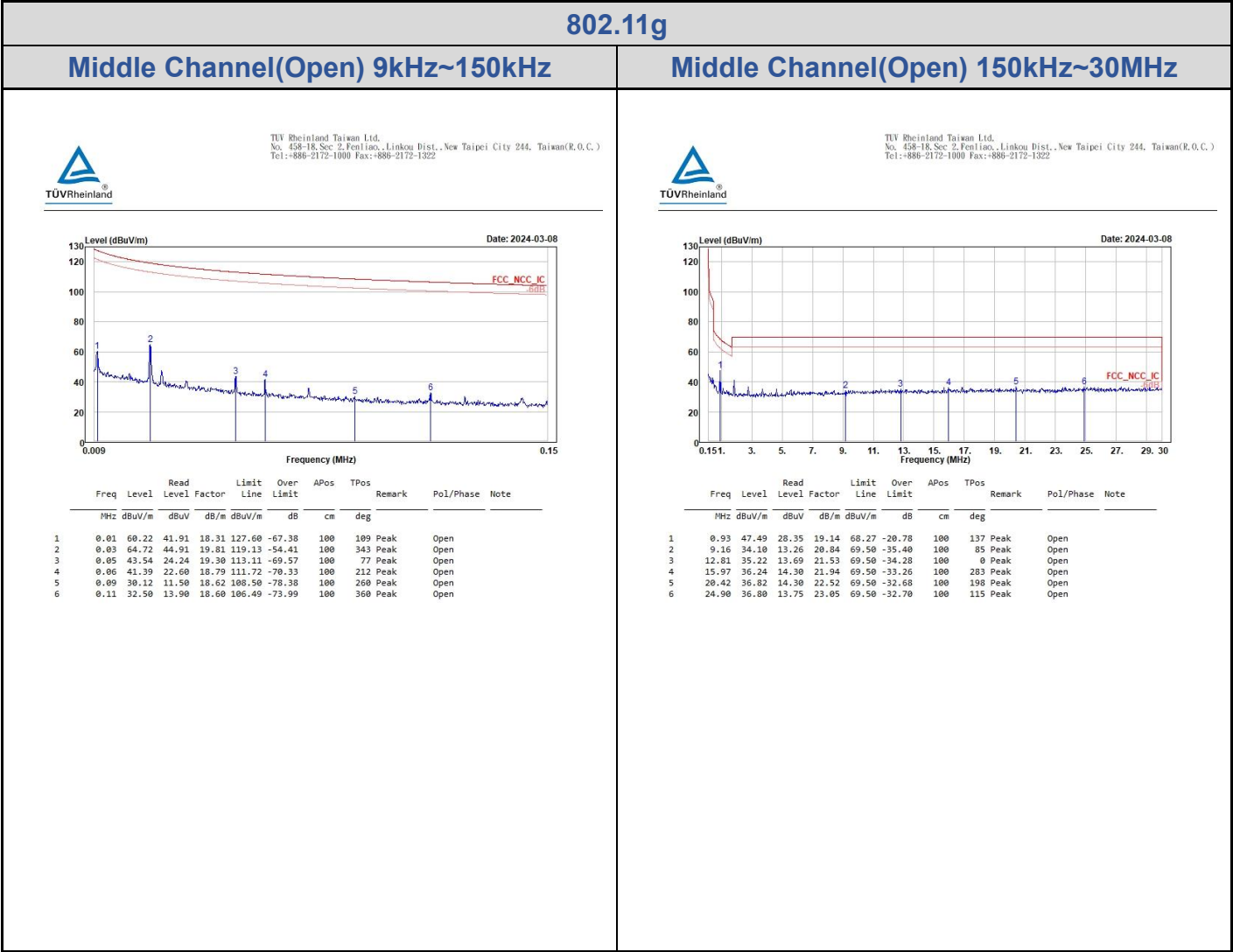


	Freq	Level	Read Level	Limit Factor	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2310.25	41.79	4.07	37.72	54.00	-12.21	102	173 Average	Vertical	
2	* 2437.00	87.48	49.20	38.28	54.00	33.48	102	173 Average	Vertical	
3	2483.60	62.21	3.89	38.32	54.00	-11.79	102	173 Average	Vertical	

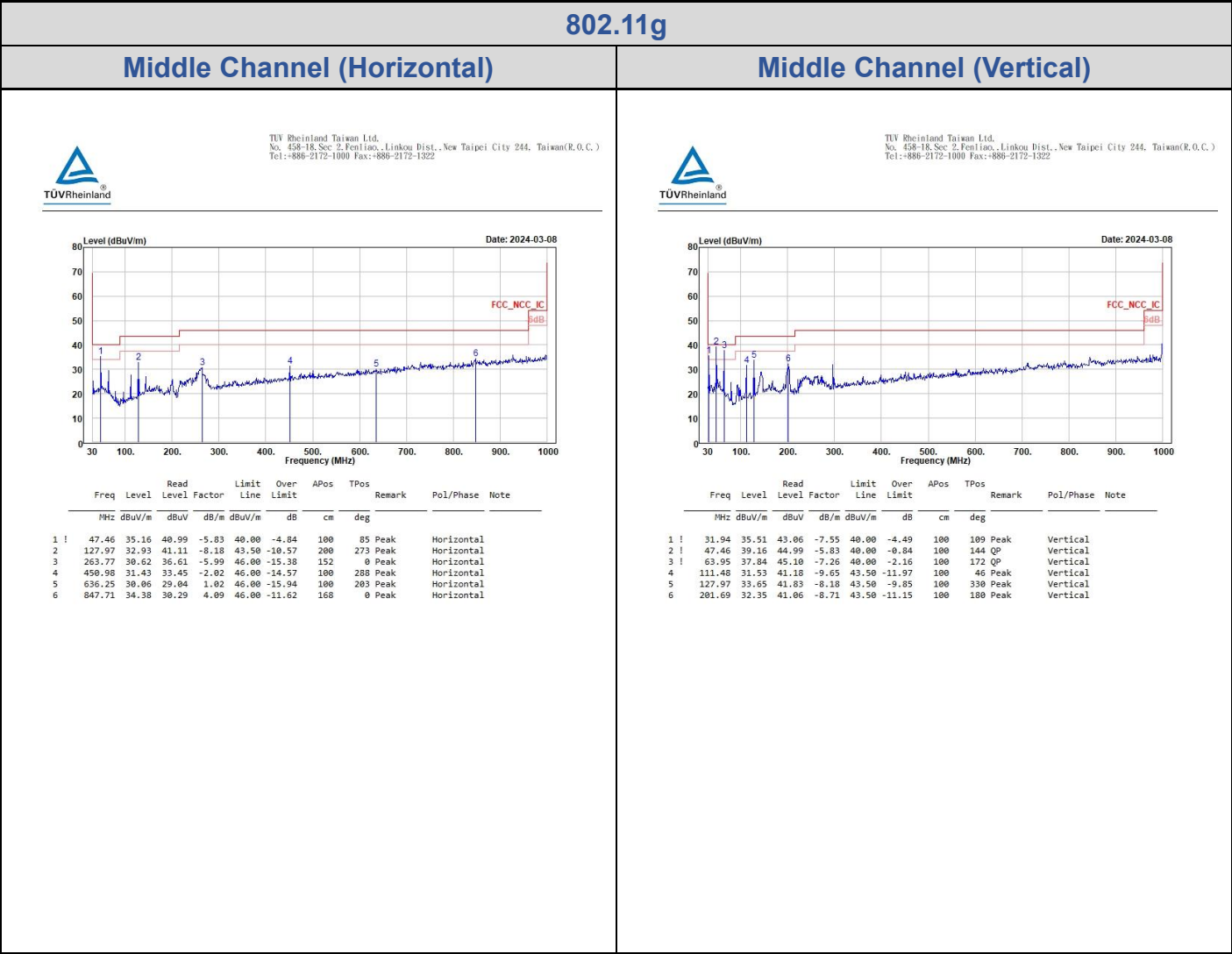


	Freq	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	NHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	2314.12	44.02	6.27	37.75	54.00	-9.98	369	172 Average	Vertical	
2 *	2462.00	87.07	48.73	38.34	54.00	33.07	369	172 Average	Vertical	
3	2483.79	42.66	4.34	38.32	54.00	-11.34	369	172 Average	Vertical	

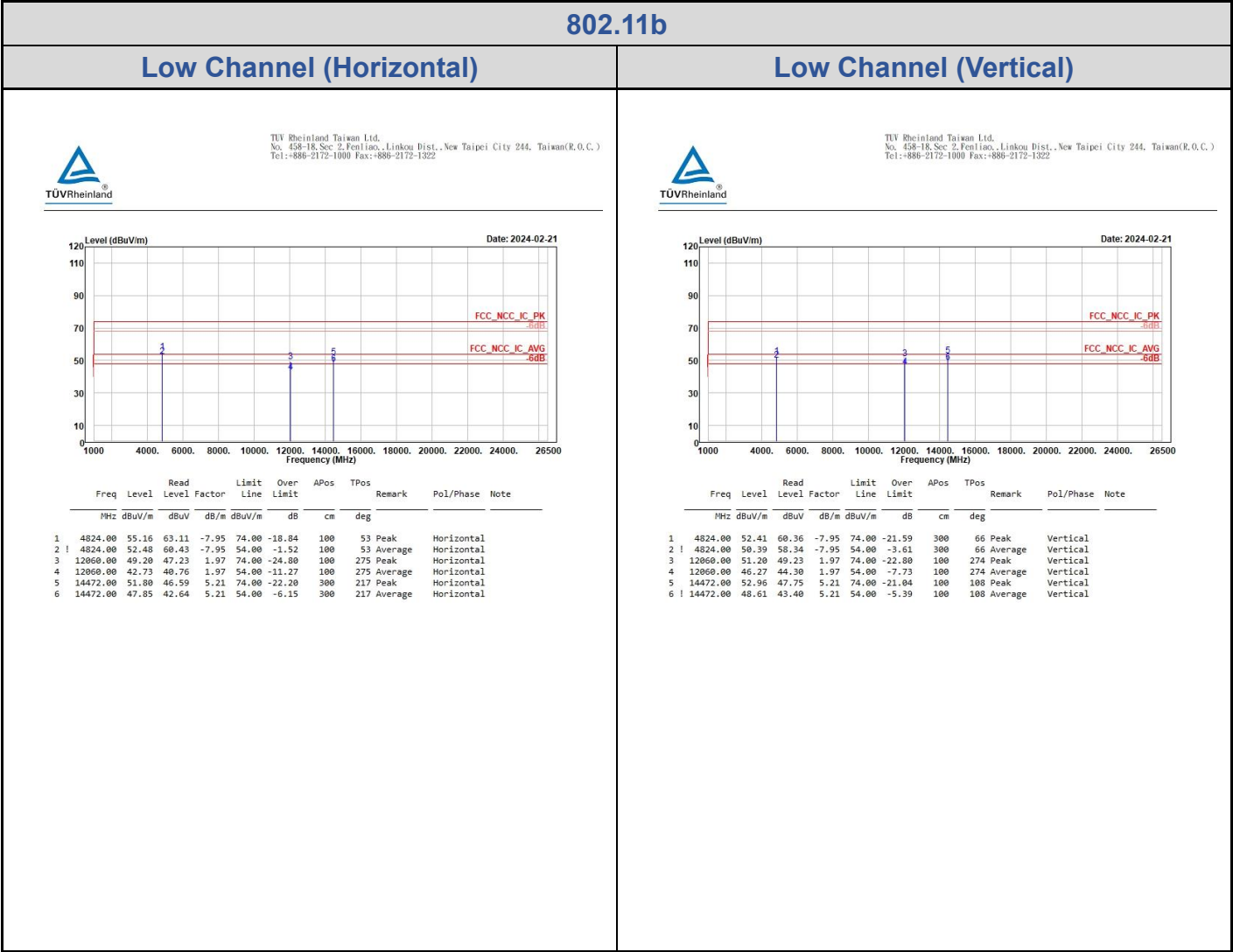
Spurious Emissions, Tx Mode, 9kHz ~ 30MHz

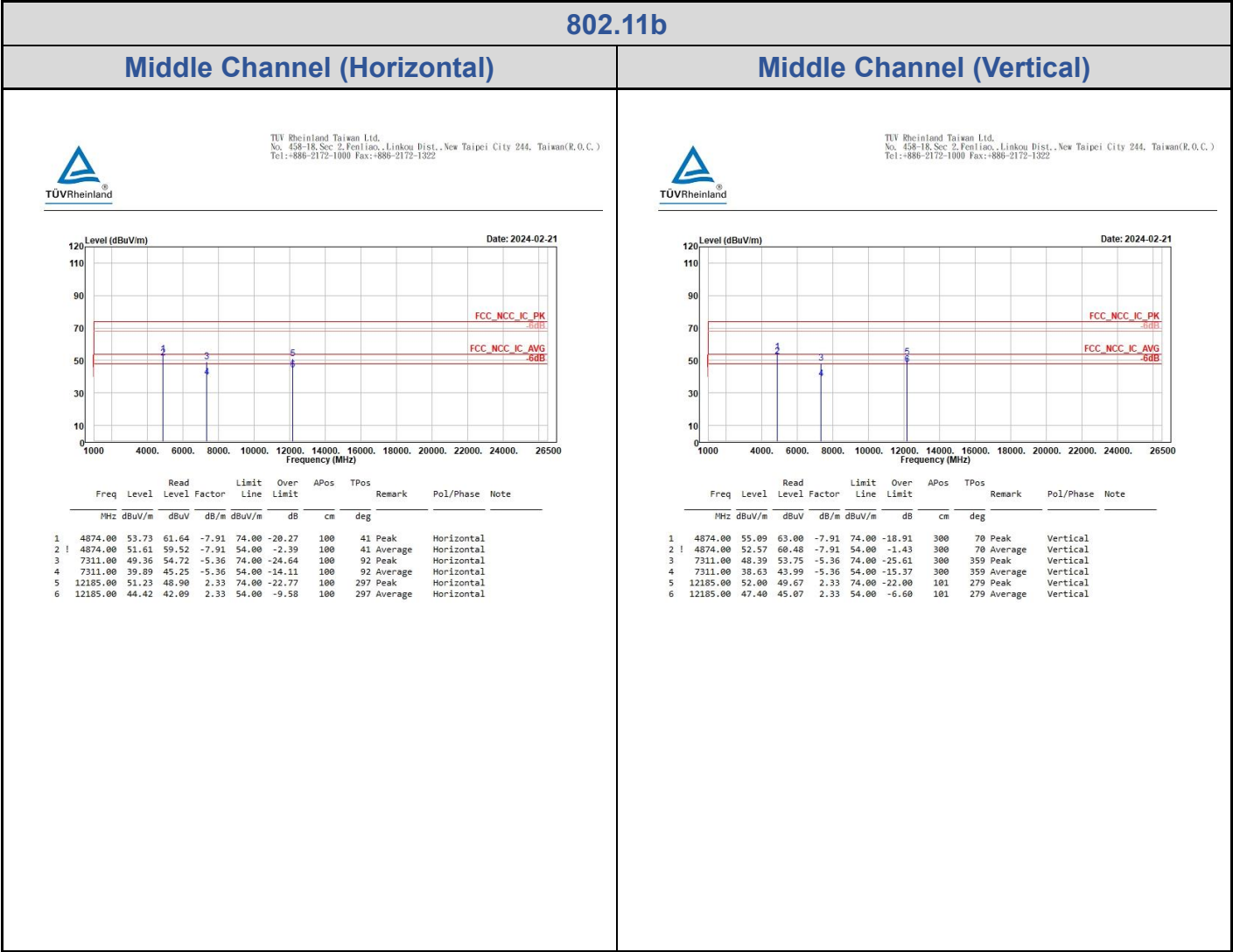


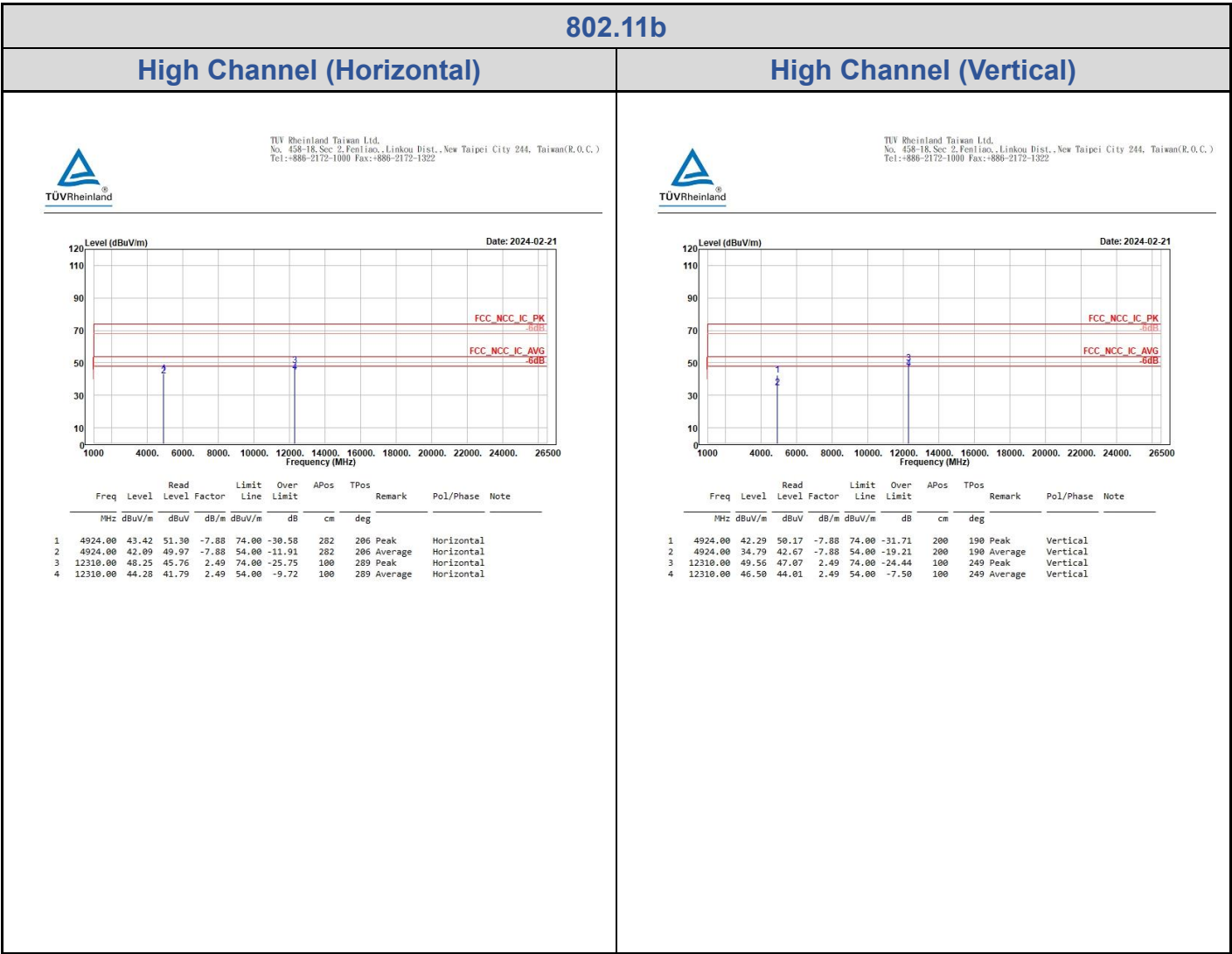
Spurious Emissions, Tx Mode, 30MHz ~ 1GHz

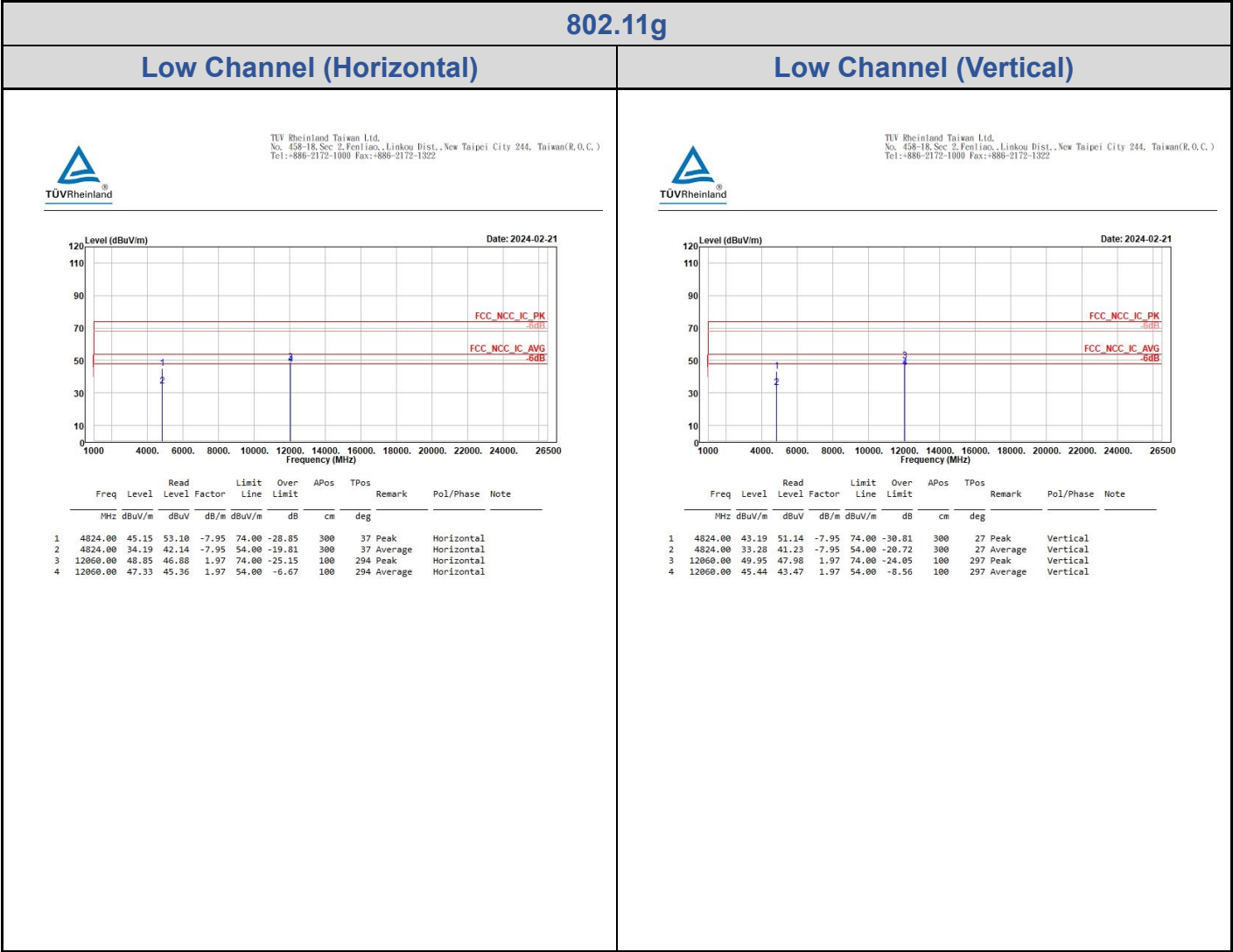


Spurious Emissions, Tx Mode, 1GHz ~ 26.5GHz







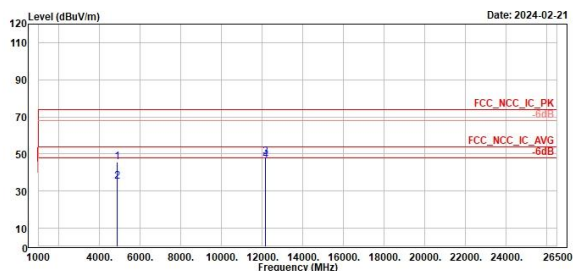


802.11g

Middle Channel (Horizontal)



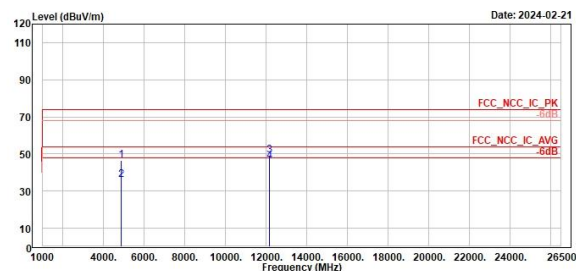
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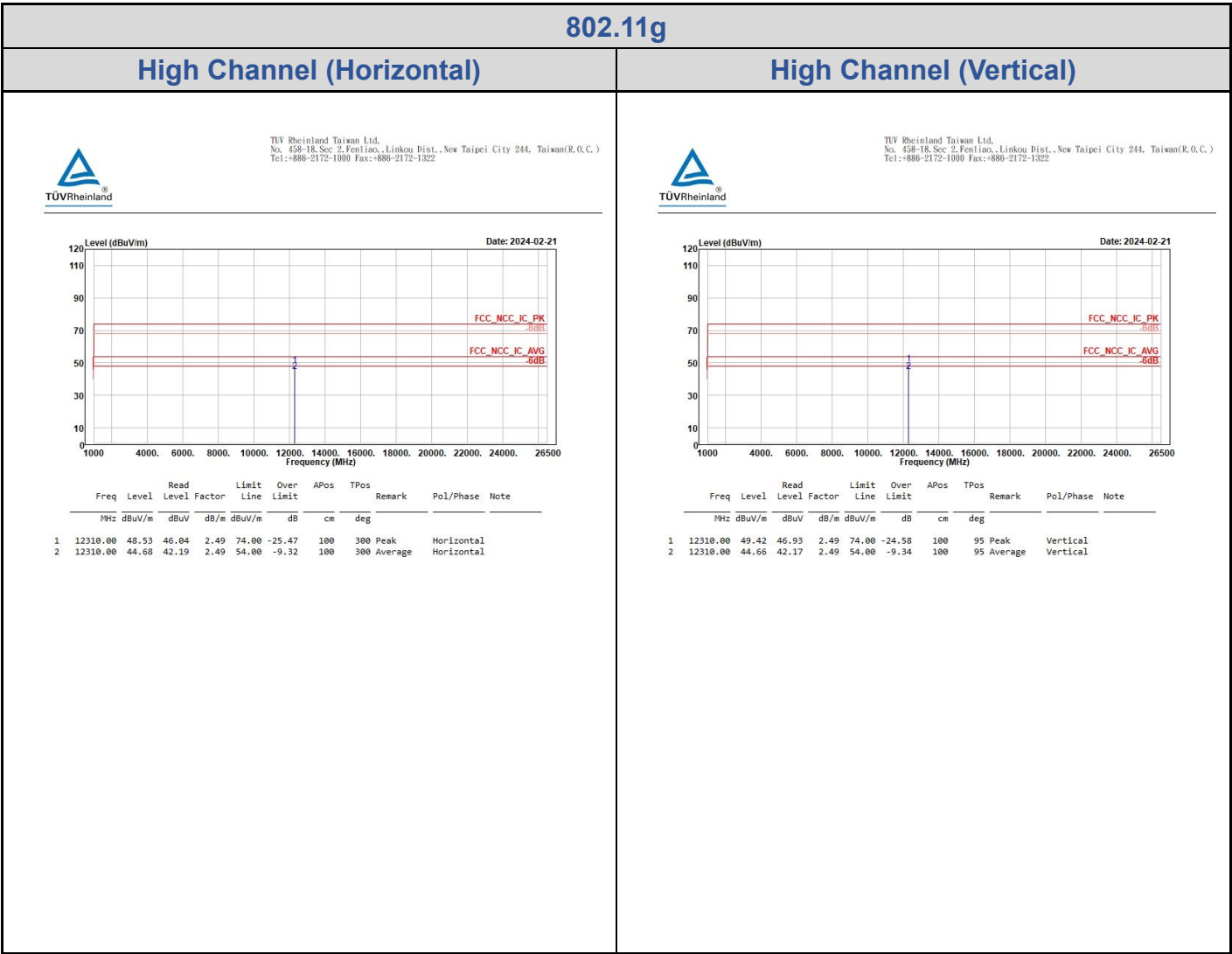
	Freq	Level	Read Limit	Line Limit	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
2	4874.00	45.43	53.34	-7.91	74.00	-28.57	100	78 Peak	Horizontal	
3	4874.00	35.89			54.00	-18.57	100	78 Average	Horizontal	
3	12185.00	48.44	46.11	2.33	74.00	-25.56	100	294 Peak	Horizontal	
4	12185.00	46.37	44.04	2.33	54.00	-7.63	100	294 Average	Horizontal	



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	Freq	Rad Level	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dB/m	Line	Limit				
		dBuV	dB/m	dBuV/m	dB	cm	deg		
1	4874.00	46.62	54.53	-7.91	74.00	-27.38	100	75 Peak	Vertical
2	4874.00	36.08		-7.91	54.00	-18.82	100	75 Average	Vertical
3	12185.00	49.17	46.64	2.33	74.00	-24.83	100	300 Peak	Vertical
4	12185.00	46.27	43.94	2.33	54.00	-7.73	100	300 Average	Vertical



802.11n HT20

Low Channel (Horizontal)

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Level (dBuV/m)

120

110

90

70

50

30

10

0

1000

4000

6000

8000

10000

12000

14000

16000

18000

20000

22000

24000

26500

Frequency (MHz)

2024-02-22

FCC_NCC_IC_PK

-60dB

FCC_NCC_IC_AVG

-50dB

1

2

Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	4824.00	43.06	51.01	-7.95	74.00	-30.94	100	37 Peak	Horizontal
2	4824.00	31.95	39.90	-7.95	54.00	-22.05	100	37 Average	Horizontal

Low Channel (Vertical)

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Level (dBuV/m)

120

110

90

70

50

30

10

0

1000

4000

6000

8000

10000

12000

14000

16000

18000

20000

22000

24000

26500

Frequency (MHz)

2024-02-22

FCC_NCC_IC_PK

-60dB

FCC_NCC_IC_AVG

-50dB

1

2

Freq	Level	Read	Limit	Over	APos	TPos	Remark	Pol/Phase	Note
MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg		
1	4824.00	42.15	50.10	-7.95	74.00	-31.85	202	360 Peak	Vertical
2	4824.00	28.62	36.57	-7.95	54.00	-25.38	202	360 Average	Vertical

